An Interdisciplinary Analysis of Multispectral Satellite Data for Selected Cover Types in the Colorado Mountains, Using Automatic Data Processing Techniques.

EREP S398

Monthly Progress Report for March, 1974

NASA Contract NAS 9-13380

Principal Investigations Management Office
Lyndon B. Johnson Space Center

Technical Monitor: Dr. Roger D. Hicks
Johnson Space Center
Mail Code TF6
Houston TX 77058

Principal Investigator: Dr. Roger M. Hoffer

Laboratory for Applications
of Remote Sensing

Purdue University
West Lafayette IN 47906

MONTHLY PROGRESS REPORT
For March 1974

A. Overall Status and Progress to Date

A.1 Manual interpretation--lithologic structures and geographic features

SKYLAB imagery from the June and August passes over the Four Corners area of Colorado, Utah, New Mexico and Arizona are being used for the identification of lithologic structures and geographic features present. Analysis is based on the S-190A sensors (Color film SO-356 and SO-242, color IR film EK 2443, IR B/W EK 2424, and B/W SO-222). Comparison of these various films are to ascertain their utility in identification of surficial features. Comparisons are being done with a microdensitometer to delineate the black and white (both IR and normal visual Pan-X) imagery. Comparisons will also be made using 70 mm slides on the I^2S system. Resolution and detectability of features are being ascertained by reproduction of the images from transparencies to color prints and then enlargement. Hopefully limits of enlargement of the color IR and visable color images will be determined. This project is coordinating with efforts relating to vegetation succession. Familiarity and actual field visits in the geographical area is aiding in this type of analysis.

A.2 Manual interpretation--plant succession patterns

SKYLAB imagery from the June and August passes over the Four Corners area of Colorado, Utah, New Mexico, and Arizona are being examined for patterns indicating plant succession. Specific sites under consideration are the Cortez, Colorado area, Canyon lands in Utah, the confluence of the Colorado and Greer rivers, and several mountainous regions including the La Sal and Blues mountains in eastern Utah. From the S190-A sensors efforts are to enhance and delimit broad vegetation types. A microdensitometer at the USGS brouse center at the Denver Federal Center is being used to aid the analysis. Particular emphasis is placed on recognizing successional patterns in vegetation. Considerable ground truth and experience has resulted from many trips around this region.

A.3 Conferences with user agencies

On March 8, 1974, a meeting was held with the interdisciplinary planning task force for Mesa Verde National Park. The purpose of the visit was to establish a working arrangement with the National Park Service Service Center to aid in evaluation of SKYLAB data.

On March 29, 1974, Ladd Frary, District Ranger of the Pine District, San Juan National Forest, indicated an interest in SKYLAB data and accompanying derived products involving the Vallecito and Lemon reservoirs. A major planning effort is underway by the Forest Service in the area.

B. Recommendations

None.

C. Expected Accomplishments

SL-2 S-192 CCT data that has been corrected for the conical scan influence has been received. During April the data will be reformatted, bulk to LARSYS, and analyses initiated.

D. Significant Results

There are no author identified significant results in this report.

E. Summary Outlook

Personnel additions have been made and the project will continue on an expanded basis.

A request for a no-cost contract extension has been sent to Contracts Administration at Purdue to be forwarded to NASA/JSC.

F. Travel Summary

Harry Hitchcock traveled to Colorado to collect ground truth from February 28, 1974 to March 10, 1974. While he was there he made plans for a continued investigation with the National Park Service. His trip report is attached.

March 12, 1974

MEMORANDUM

TO: R. M. Hoffer
S. G. Luther

FROM: H. C. Hitchcock III

SUBJECT: Colorado Trip

Monday, March 4

Met with approximately 8 people at the Mesa Verde National Park. Personnel attending included: Ron Switzer, Park Superintendent; Rick Anderson, Asst. Superintendent; Kim Fene, Chief Ranger; and the park archeologist. I reviewed my work over the past 4 months then a general discussion was held. Topics discussed were: (1) constructing a visual display for the Park interpretative program emphasizing SKYLAB photography and (2) production of a vegetation map useful in the day-to-day operations of the Park.

Tuesday, March 5

The entire day was spent with Kim Fene in the field. Visits were made on the ground to each of the vegetation types which they desired to include in the proposed vegetation map.

Wednesday, March 6

An overflight of the Park was made by myself and Rick Anderson. Oblique photos were taken the entire length of Wetherill, Chapin, Moccasin, and White Mesas. Altitude was approximately 800'.

Thursday, March 7

Thursday was spent in discussion with Rick Anderson concerning the proposed display and vegetation map.

Friday, March 8

Met with Paula Krebs, Phil Dittberner, Fred Babb and David Breternitz at the Denver Service Center. Discussion topics ranged from LARS capabilities to the specific Park Service needs.

Decisions made:

(A) Mesa Verde National Park

1. I will have a negative of the S190B park coverage made. The Park Service will then have this enlarged and printed, hopefully, at a scale complementing the 1:24,000 topo map of the park. I will also provide them with assorted 8 x 10 photos to be keyed to the enlargement. These photos will include a computer-classification, and aerial pictures with ground photos as inserts. From these materials they will construct a display to be placed in the foyer of the visitor centers. I will also provide them suggested captions for each photo.

2. LARS will provide the park personnel with a vegetation map including at a minimum 7 classes: Douglas-fir, Chaparral, Pinyon-juniper, Grasses, Sagebrush, Semi-desert Chaparral and recent burns. This will be a supervised classification based on assembled ground truth.

Ground truth will be a vegetation map produced by myself from 1:24,000 stereo aerial photographs taken in 1968. 1:24,000 orthophoto quads (1971) will be used as supplementary data along with field observations and photos taken on this trip.

Evaluation

The park Superintendent will provide LARS with a field evaluation of both products. Types of questions to be answered will include:

(a) Is the display an effective device in enhancing the park interpretive program?

(b) Is the map useful in the day-to-day park operations?

(c) Is sufficient detail and accuracy included in the map to replace the existing map?

(d) In what specific projects or programs has the map proved beneficial and in what ways?

(B) Denver Service Center

LARS will provide the National Park Service with a primary and secondary product which they will evaluate and comment on:

1. Vegetation map of Mesa Verde, developed from S-190A SKYLAB photography.

2. A computer-aided vegetation map from June 5, 1973 ERTS-1 data including as a minimum the 7 classes previously mentioned. (Attempts will be made to produce a comparison map including as much detail as the map produced from the 1:24,000 photos.)

3. The 1:24,000 vegetation map produced from air photos.

Evaluation

The two products will be used in a planning mode by the National Park Service. They will evaluate both products separately and in conjunction with each other.

They will outline the specific needs that such a map should fulfill and the degree to which the two products meet these requirements.

HCH/dd